disk of Elasmobranchs originate spontaneously. It is indeed far more likely that they originate by a process of segmentation in which the marginal cells of the blastodisk are involved the same as in Teleosts. Such a view is in fact supported by fig. 15 given in Balfour's Comparative Embryology, Vol. II, p. 34, in which two free nuclear spindles are shown at the edge of the deeper-lying part of the blastodisk of Pristiurus in the morula condition, consisting of four superimposed rows of cells. Balfour's figure also shows that between the lowermost cells composing the blastodisk and the coarsely granular vitellus there is still a considerable unsegmented stratum of finely granular plasma interposed. In this lower layer of finely granular plasma alone the "free nuclei" are found, thus furnishing additional evidence that the view expressed above as to the origin of such nuclei is probably correct. In the disk of Raia examined by me the cleavage planes are also marked by the clear margins of adjacent cells, as in the blastodisk of Pristiurus figured by Balfour. The blastodisk of Raia here figured and described measured 1.71 millimeters in width and 2.37 millimeters in length. Its thickness in the center was about .6 of a millimeter, and thinned out at the margin into a very thin layer of plasma which is obviously homologous with the cortical or periblastic layer of the teleostean egg. Later stages of the blastodisk of Raia show it subdivided into smaller and more irregular cellular areas; the whole disk also again assumes much more nearly the original discoidal form characteristic of it previous to the beginning of segmentation. To judge from the condition of the blastodisk here described, it of course is to be inferred that the fertilization of the egg takes place while it is still in the oviduct, or possibly even before it enters the latter.—*John A. Ryder.*

PHYSIOLOGY.[1]

GLYCOGENIC FUNCTION OF THE LIVER.—I see that in your general notes on Physiology in the April number of the AMERICAN NATURALIST, p. 397, an abstract is given of Professor Seegen's researches on the glycogenic function of the liver. One of his most important conclusions is that peptones are destroyed in the liver by being split into liver-sugar and a nitrogenous residue. Now this is exactly the conclusion at which I arrived in my paper, "On the glycogenic function of the liver," published eight years ago.[2] In that paper I say (p. 102): "Therefore—and this is a very important point—*albuminoids are decomposed in the liver into glycogen and some nitrogenous matter* which is excreted partly in the bile but probably mostly restored to the blood to be excreted as urea by the kidney. In this way excess of albuminoid over and above what is necessary for build-

[1] This department is edited by Professor HENRY SEWALL, of Ann Arbor, Michigan.
[2] *Am. Jour. Sci.*, Vol. XV, p. 99, 1878.

ing is reduced to a condition suitable for combustion." I do not pretend to put my results, founded entirely on general reasoning, on the same footing as the careful researches and experiments of Professor Seegen, but it seems to me so explicit a statement deserves recognition.

Again Professor Seegen draws attention to the fact that fasting animals still continue to make liver-sugar and that therefore this function *is continuous*. In the same paper I state that waste tissues being albuminoid are undoubtedly eliminated in the same way, *i. e.*, by splitting in the liver into a carbo-hydrate *which is burned* and an incombustible nitrogenous residue to be eliminated mostly by the kidneys. The researches of Schiff[1] demonstrate that waste tissue undergo some important, yea necessary, change in the liver, but as to the nature of the change he says nothing. If the disposal of waste is connected with sugar making, as I affirm, this fact entirely explains the continuity of the function.

Again Professor Seegen says: "The formation of peptones (at least in carnivores not growing) is mostly to form sugar." I say, "The whole albuminoid-excess is split into sugar to be burned for vital force and vital heat and an incombustible residue to be otherwise eliminated, *i. e.*, the whole albuminoid-excess is utilized as sugar."

As to the experiments of Professor Seegen and others showing that with carbo-hydrate diet the sugar in the portal vein is less than in hepatic vein, I confess they are wholly unintelligible to me. What becomes of the sugar which is absorbed in such large quantities? Is it not possible that it may be present in some form which does not respond to the ordinary tests for glucose?

The final conclusion of Professor Seegen that *glycogen* always present in the liver *is not the source of liver-sugar*, must be established on very firm basis before it will be accepted by physiologists.—*Joseph LeConte.*

BERKELEY, CAL., *April 8, 1886.*

PSYCHOLOGY.

MEYNERT'S PSYCHIATRY,[2] VOL. I.—This volume of 285 pages is largely devoted to the gross and minute anatomy of the brain. Besides the appendix on the mechanism of expression, and a short chapter on the nutrition of the brain, two-thirds of the book are devoted to anatomy and one-third to the physiology of this important organ. The work represents the results of Meynert's researches up to 1884, and is of first-class value as embracing the

[1] Arch. des Sciences, Vol. 58, p. 203, 1877.

[2] Psychiatry, a clinical treatise on diseases of the Fore-brain. By Theodor Meynert, M.D., professor of nervous diseases and chief of psychiatric clinic of Vienna. Translated by B. Sachs, M.D. Vol. I. New York, G. P. Putnam's Sons. 8vo, 1885.